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Breast imaging update

Breast imaging: choosing the right modality.

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- Do the most appropriate test
- Do it properly
- There is no place for single view mammograms or half-hearted ultrasound

Breast imaging has moved beyond old style 2D mammography with 3D mammograms or tomosynthesis becoming the global standard of care, certainly in the diagnostic environment. Tomosynthesis provides a CT scan-like image data set that results in increased cancer detection. Most tomosynthesis machines now reconstruct images from the raw data to create "synthesized" 2D-like images with enhancement of calcium. This further reduces the total radiation dose given to any patient.

The addition of ultrasound to mammography/tomosynthesis has been further demonstrated to increase cancer detection. Ideally both these tests need to be done at the same time to permit direct correlation of the two imaging modalities. Imaging

reports often classify breast lesions into BIRADS categories (Table 1). If there is any suspicious abnormality, BIRADS 4 or more, it requires breast surgical review followed by biopsy. Breast biopsy is usually performed using the guidance of the modality which demonstrates the abnormality:

- if the lesion is seen on ultrasound then ultrasound guided biopsy
- if the abnormality is seen on mammogram/tomo then stereotactic biopsy.

Most suspicious lesions will also have a clip placed at the time of the biopsy to allow for monitoring, follow up and ease of localisation should surgery be required.

Breast MRI and contrast enhanced mammograms are used as adjunct screening and diagnostic tools in special circumstances. We provide a general guide for breast imaging across all age groups on the following pages. Depending on surgical preferences, most patients will require surgical review prior to obtaining a breast biopsy.

TABLE 1: BIRADS categories

| | |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| BIRADS 1: | Normal - routine follow up |
| BIRADS 2: | Benign - routine follow up |
| BIRADS 3: | Indeterminate or probably benign - for early review; malignancy risk <2% |
| BIRADS 4: | Probably malignant - needs biopsy <ul style="list-style-type: none"> - 4A malignancy risk 2-10% - 4B malignancy risk 10-50% - 4C malignancy risk 50-95% |
| BIRADS 5: | Malignant - needs biopsy followed by definite treatment, malignancy risk >95% |
| BIRADS 6: | Biopsy proven malignancy - for definite therapy |

General guide for breast imaging

Girls and women under 20 years old with palpable mass or breast symptom

- Ultrasound: if benign STOP
- If malignant: surgical review followed by Tomosynthesis and/or MRI and biopsy

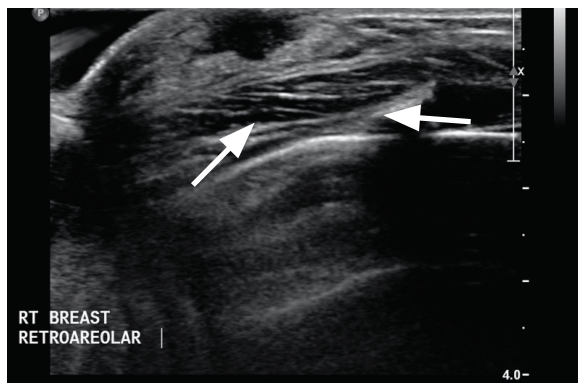


Figure 1:
Normal breast bud development in a 9-year-old girl: BIRADS 1

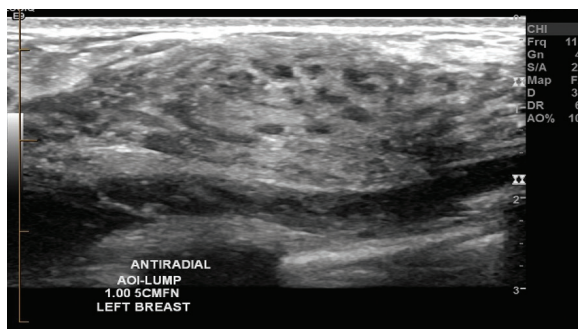


Figure 2:
Normal breast parenchyma presenting as a palpable lump: BIRADS 1

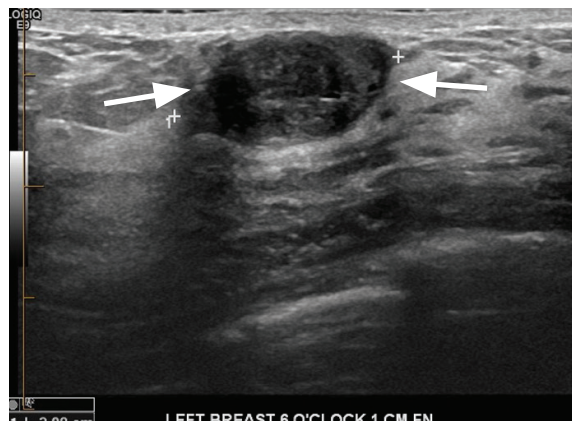


Figure 3:
Palpable lump in a 14-year-old girl = fibroadenoma. However since this was palpable, she saw a surgeon and had a core biopsy under ultrasound control. BIRADS 2

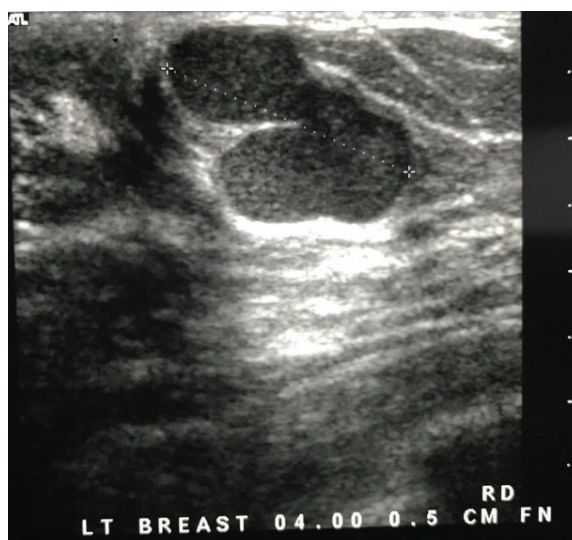


Figure 4:
12-year-old with palpable mass: cyst. This is developmental duct ectasia. This requires watchful waiting as most cases resolve over time spontaneously. BIRADS 1

General guide for breast imaging

Women 20-35 years old with a palpable mass No family history

- Ultrasound: if benign STOP
- Ultrasound: if malignant, needs full work up

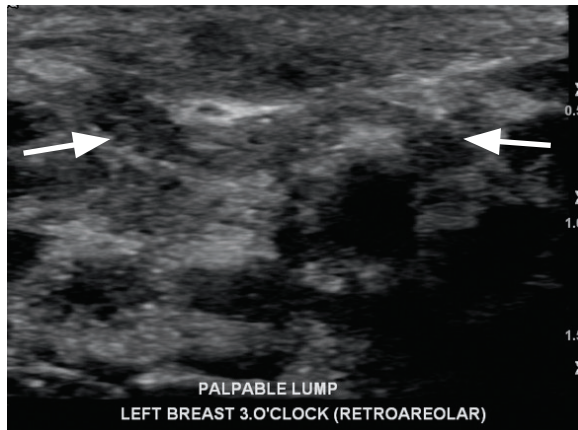


Figure 5:
26-year-old with itchy thickened nipple: Nipple eczema. BIRADS 2

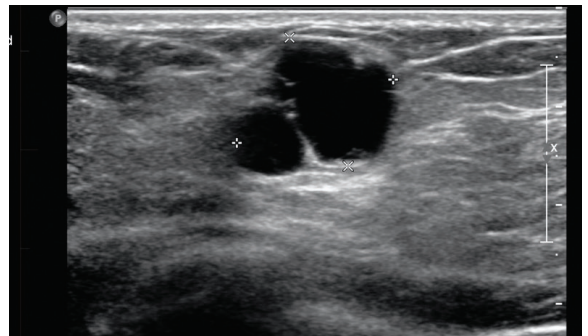


Figure 7:
Palpable lesion is a simple cyst, leave alone. This can be aspirated to dryness under ultrasound if required. BIRADS 2

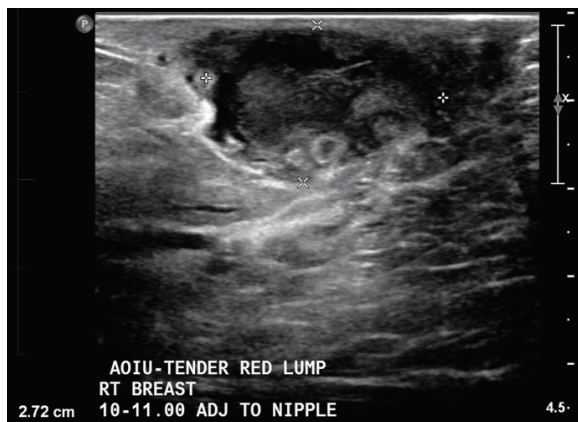


Figure 6:
Lactational abscess. These require ultrasound guided drainage. Needle at least 14G Jelco, with antibiotic therapy for at least ten days, Follow up on third day after aspiration for repeat aspiration. If diminishing aspirate, then review 3, 5, 8th day after initial aspiration. Stop when no aspiration required. Continue breast feeding. BIRADS 2

General guide for breast imaging

Women 20-35 years old with a palpable mass (cont.) No family history

- Ultrasound: if benign STOP
- Ultrasound: if malignant, needs full work up

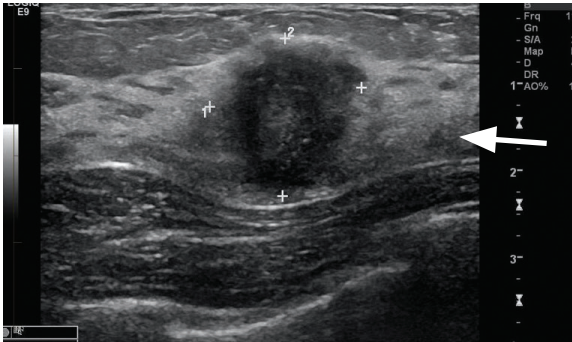


Figure 8a:

28 female with palpable lesion left breast. ON ultrasound examination, the lesion is BIRADS 5 = cancer. Requires complete work up with tomosynthesis prior to surgical review and biopsy. BIRADS 5

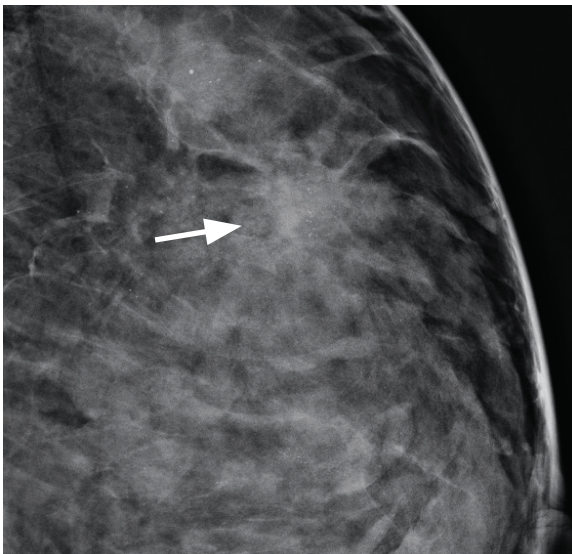


Figure 8b:

Selected tomosynthesis image from tomosynthesis data set demonstrating spiculated mass (arrow) corresponding to the ultrasound abnormality. Also note clustered calcification associated with the primary tumour. This requires surgical review followed by ultrasound guided core biopsy and clip insertion. She will also have an MRI scan. BIRADS 5

General guide for breast imaging

Women 35 years or older with a palpable mass

- DBT + ultrasound
- MRI/CESM if needed

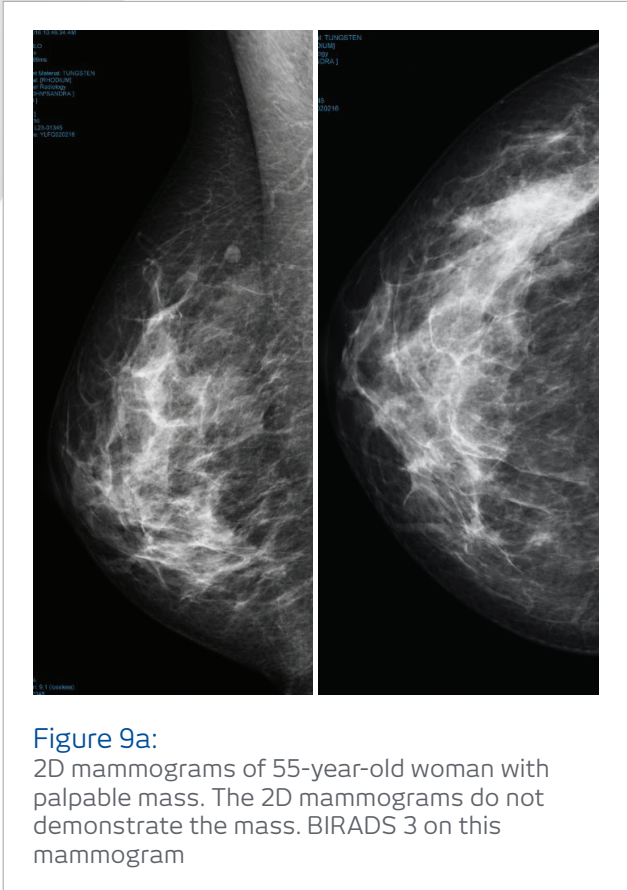


Figure 9a:
2D mammograms of 55-year-old woman with palpable mass. The 2D mammograms do not demonstrate the mass. BIRADS 3 on this mammogram

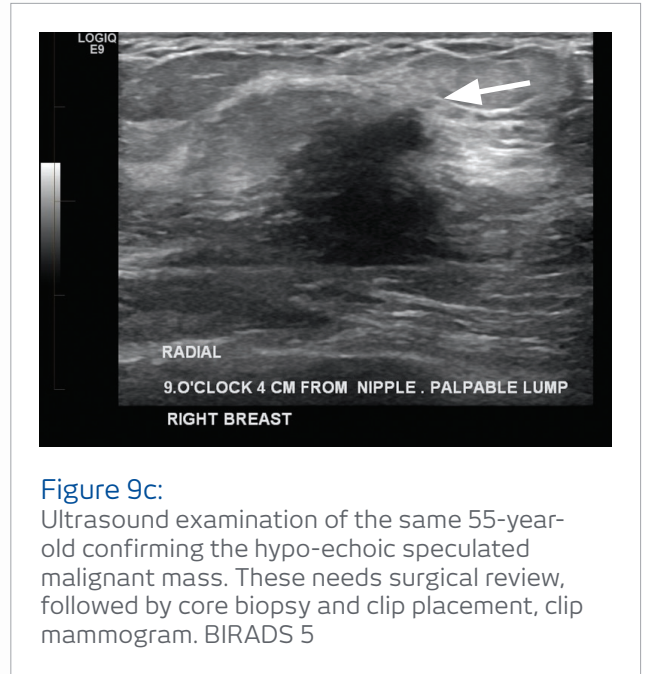


Figure 9c:
Ultrasound examination of the same 55-year-old confirming the hypo-echoic speculated malignant mass. These needs surgical review, followed by core biopsy and clip placement, clip mammogram. BIRADS 5

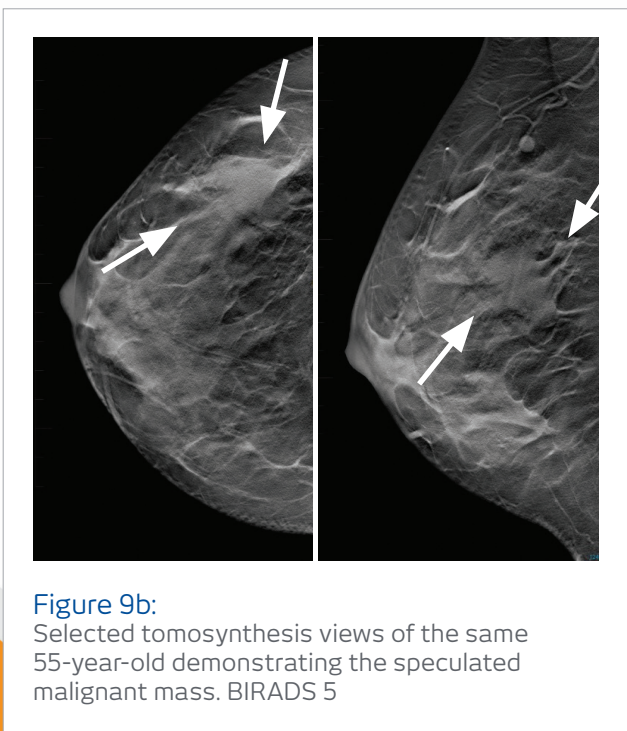


Figure 9b:
Selected tomosynthesis views of the same 55-year-old demonstrating the speculated malignant mass. BIRADS 5

General guide for breast imaging

Women 35 years or older with a palpable mass (cont.)

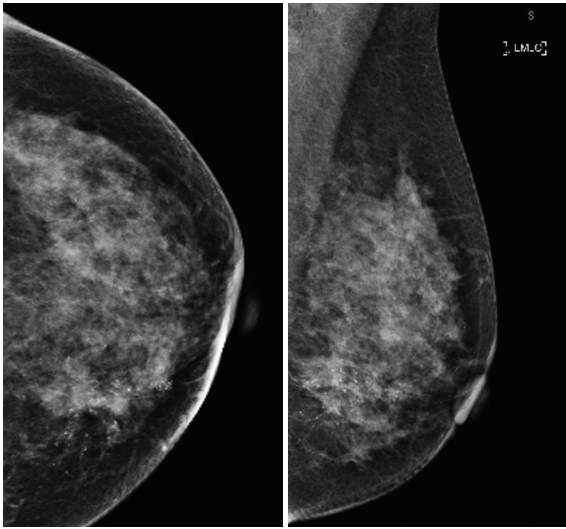


Figure 10a:
45-year-old woman screening mammogram. There is extensive pleomorphic calcification in the left breast lower inner quadrant, most likely high grade DCIS. BIRADS 5

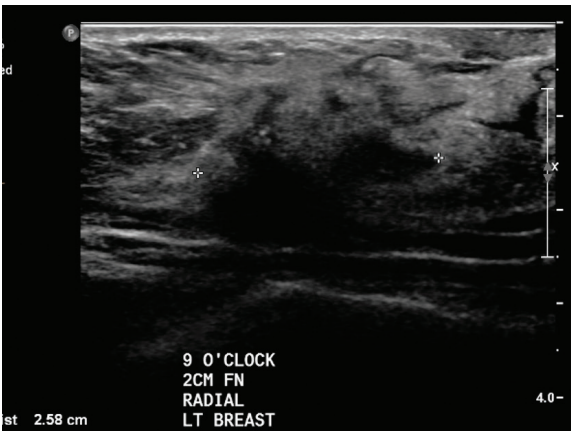


Figure 10b:
Ultrasound images demonstrating a spiculate mass with central calcification distorting tissue planes, left breast 9 o'clock position 2cm from the nipple. BIRADS 5. Needs surgical review, ultrasound core biopsy, clip insertion, clip mammogram.

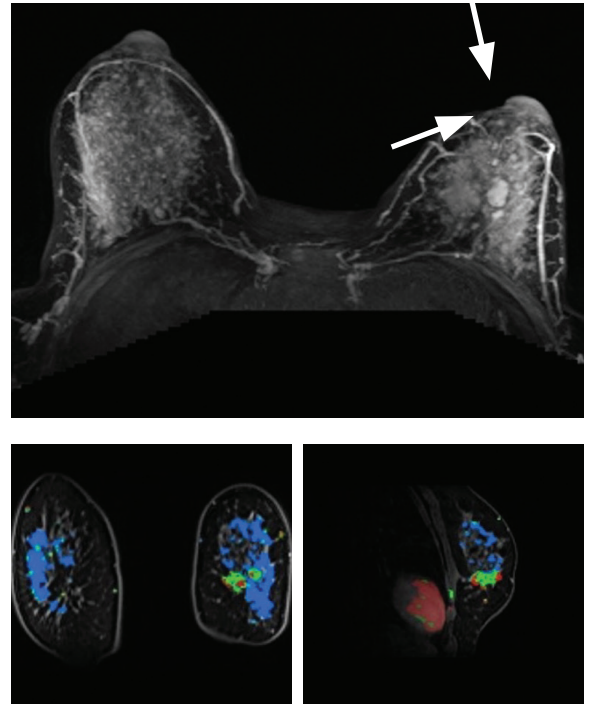


Figure 10c:
MRI scans demonstrate the malignant mass (arrows in the black and white picture, and red on the colour maps). BIRADS 5

General guide for breast imaging

Strong family history screening

- DBT + ultrasound + MRI annually
This patient requires a tailored screening program after review with a breast surgeon.

Breast implants

- MRI



Figure 11:
Breast Implant MRI demonstrating intra-capsular rupture of right breast implant (arrow) with a typical linguini sign.

References:
ACR BIRADS Atlas 5th Edition (2013)
<https://www.acr.org/Clinical-Resources/Reporting-and-Data-Systems/Bi-Rads>



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Dr Manish Jain has been clinic director at I-MED Radiology in Monash since 2002, providing a personal service to the many general and specialist referrers. Dr Jain has worked with I-MED Radiology since 2000 and works as a senior radiologist at Monash Breast Screen.

Dr Jain has expertise in breast imaging and interventional procedures, including ultrasound guided, stereotactic and MRI-guided procedures.



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